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APR 15 1916

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Department of Agricultural Investigations
American Smelting and Refining Company

Sterelity in Oats Caused by Grass Thrips

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February 1, 1915

SB608
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Sterility in Oats Caused by Grass Thrips

During the season of 1914 our attention was frequently directed to a condition which prevailed in practically all of the oat fields in the Salt Lake valley, namely, a blighting of the ears or spikelets. About the time that the oat plants were heading it was noted that many of the spikelets were smaller than normal and were whitish and shrivelled. Upon examination it was found that these whitish spikelets had no kernels in them, there being nothing left but the empty husks or glumes; frequently more than fifty per cent of the spikelets were found to be injured and contained no kernels. Invariably, the cause of this condition was not understood by the farmers of the valley.



A—Head of oats seriously injured by grass thrips (*Anaphothrips striatus*). Note the small white spikelets in which there are no kernels.

D—Head of oats in which only a few of the lower spikelets have been injured. Specimens taken in Salt Lake valley by W. W. Jones. (Original.)

Popular Name for Injury

This type of injury to oats has been known for a good many years, and has been frequently referred to as "White-top" and "Silver-top" by reason of the peculiar whitened appearance of the injured spikelets. We have records of injury of this sort from many portions of the United States, Canada and Europe. The cause of the injury is due to a very minute insect known as the grass thrips, *Anaphothrips striatus*. This insect is so small and so active in its movements that the trained observer will often fail to find it, while the farmer would never see it, even though he were to look for it. This insect averages about one-twentieth of an inch in length and being of a light yellow color is rarely ever noted by the casual observer.

Life History of the Insect

The length of the female insect, as stated above, averages about one-twentieth of an inch. The color is yellow, with more or less dusky or brownish shading in some of its parts. Male insects have been found infrequently and, therefore are much fewer in number than the female. The eggs are bean-shaped and are very minute, being slightly more than one one-hundredth of an inch in length. The adult insects hibernate, that is, live over winter, in places where they have been feeding, such as the stems of grains which have been cut and have died down, as well as under rubbish and in crevices. They are able to withstand very low temperatures, even as low as fifty-three degrees below zero Fahrenheit. The females become active very early in the spring, at least as soon as the grasses and grains begin to grow. Egg laying soon takes place and may last for a number of weeks, each female being able to deposit from fifty to sixty eggs. In from ten to fifteen days, during the spring months, the eggs are hatched; while during the summer the time required is from four to seven days. It requires from twelve to thirty days for the insect to pass from the egg stage to the mature or adult stage. Numerous broods, therefore, appear or are produced, during the summer season, and it has been noted in the Salt Lake valley that this insect is active at least up to the early part of December whenever green plants may be found to feed upon. During the past season this insect was noted as being active on volunteer oats as late as December 12th in localities where the frost had not

completely killed the plants. The insect does not confine its attacks to oats, but is found to injure rye, wheat and various grasses. It is a peculiarly injurious insect when it attacks timothy.

Injury Produced

In oats the injury is largely confined to the spikelets, although the leaves may also be attacked. The injured spikelets are usually more or less whitened or bleached in appearance and are shrivelled and thin. Such spikelets contain no kernels or grains. This injury is largely produced before the spikelets emerge from the sheath or boot. The insects, both young and old, feed mainly within the leaf sheaths but may also be found doing injury outside. The spikelets are attacked before they emerge from the leaf sheaths, both the young and old insects feeding upon them, producing complete sterility by sucking the ovaries and feeding upon other young parts of the flower. It is only when the spikelets emerge from the sheaths that the extent of the injury is noted. As previously stated the injury to oats may reach as high as fifty per cent or more. From what has been noted during the season of 1914 in the Salt Lake valley, it is easy to explain the low yields in most fields. It may be said in passing that the insect which produces such severe injury to oats belongs to a group or family of insects, many members of which cause great losses to the farmer. As an instance, it may be noted that an insect very closely related to the insect described above produces heavy losses to the pear and cherry growers of California. It also attacks other fruits in a serious degree. In California it is known as the most dangerous and destructive insect to certain deciduous fruits, and it is one of the hardest to successfully combat.

Control Measures

As the Grass Thrips, which has been noted as seriously attacking oats, feeds on other cereals as well as on grasses, it is evident that control would be difficult. Knowing its habits, it is readily seen that grasses, weeds and volunteer crops of grain should be destroyed in one way or other so as not to provide food and places to hibernate in fields where it is intended to grow oats the following year. It is recommended that deep fall plowing be practiced, and this will have its advantages outside of the matter of insect control. It has been suggested also that the stubble be burned after the grain has been cut, but this is a poor practice from the agricultural point of view. It has been noted that early varieties of oats are less seriously

injured than the later ripening varieties, and if this proves true, advantage may be taken of them. Where it is desired to put in winter varieties of cereals, such as wheat or oats, it has been suggested that either rye or oats be sown in a strip around the field some two or three weeks before planting the winter grain. The insects are attracted to such a "trap" crop, and if this crop is removed before the permanent crop appears above the ground, large numbers of the insects will be destroyed.

In closing it may be said that there is absolutely no doubt as to the cause of the injury to oats in the Salt Lake valley, as noted in this paper, or to the identity of the insect. The findings of the writer have been fully corroborated by no less an authority than Dr. W. E. Hinds, who for several years was an entomologist in the U. S. Department of Agriculture, and who is now entomologist at the Alabama Agricultural Experiment station. Dr. Hinds made a special study of this group of insects for several years, and is, therefore, our American authority on thrips.

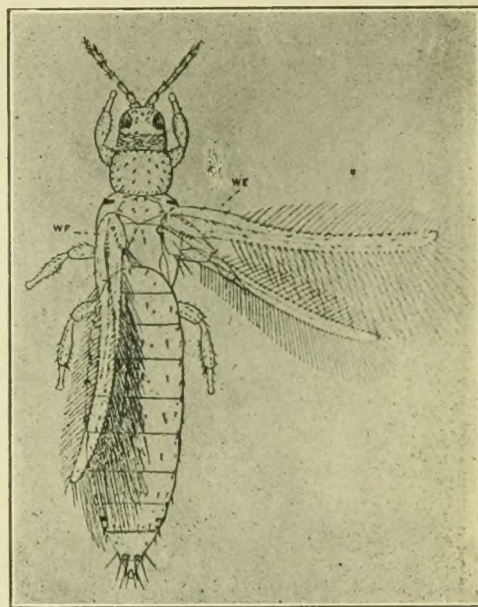


Illustration of Grass Thrips (*Anaphothrips striatus*) Enlarged About 55 Diameters

The area covered by the illustration is approximately three thousand times the area that would be covered by the life size specimen. Note the peculiar wings, left being folded and the right extended.

(After Fernald and Hinds)

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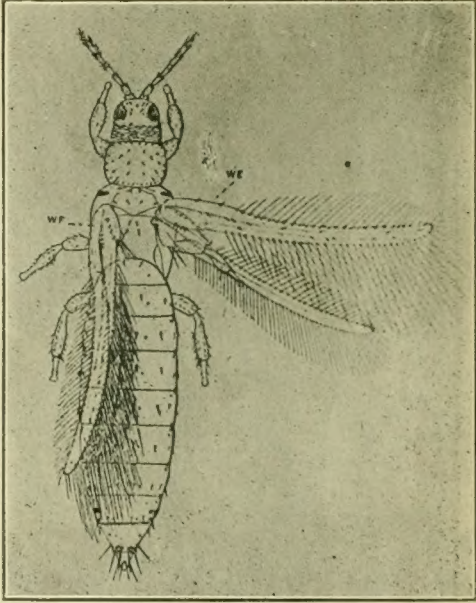


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